

28. Element Types

28.0 General

The following lists the Element Types included in the NRCM. These were selected for modeling based on a review of the charges proposed by ILECs during negotiation and arbitration proceedings. These Element Types consist primarily of all work activities performed in the delivery of each service to existing customers (migration)²² and new customers (installation)²³.

In NRCM 2.2, there are 49 Element Types that are listed on the following pages of this NTAB Document.

²² Migration is defined as moving existing ILEC customers to a CLEC.

Types of Non-Recurring Charges

Name	
1	POTS / ISDN BRI Migration (TSR)
2	POTS / ISDN BRI Install (TSR)
3	POTS / ISDN BRI Migration (UNE Platform)
4	POTS / ISDN BRI Install (UNE Platform)
5	POTS / ISDN BRI Disconnect (TSR / UNE Platform)
6	POTS / ISDN BRI Migration (UNE Loop)
7	POTS / ISDN BRI Install (UNE Loop)
8	POTS / ISDN BRI Disconnect (UNE Loop)
9	Feature Changes
10	4 Wire Migration (UNE Loop)
11	4 Wire Install (UNE Loop)
12	4 Wire Disconnect (UNE Loop)
13	2 Wire Migration at the FDI
14	2 Wire Disconnect at the FDI
15	4 Wire Migration at the FDI
16	4 Wire Disconnect at the FDI
17	2 Wire Migration at 6 line NID
18	Channelized DS1 Virtual Feeder to RT Install
19	Channelized DS1 Virtual Feeder to RT Disconnect
20	DS1 Interoffice Transport Install
21	DS1 Interoffice Transport Disconnect
22	DS3 Interoffice Transport Install
23	DS3 Interoffice Transport Disconnect
24	2 Wire Loop, different CO Migration
25	2 Wire Loop, different CO Install
26	2 Wire Loop, different CO Disconnect
27	4 Wire Loop, different CO Migration
28	4 Wire Loop, different CO Install
29	4 Wire Loop, different CO Disconnect
30	DS1 Loop to Customer Premise Migration
31	DS1 Loop to Customer Premise Install
32	DS1 Loop to Customer Premise Disconnect
33	DS3 Loop to Customer Premise Migration
34	DS3 Loop to Customer Premise Install
35	DS3 Loop to Customer Premise Disconnect
36	Line Port (DS0, Analog, ISLU) Install
37	Line Port (DS0, Analog, ISLU) Disconnect
38	Channelized DS1 line port (TR-303-IDT) Install
39	Channelized DS1 line port (TR-303-IDT) Disconnect
40	Fiber Cross Connects Install (LGX)
41	Fiber Disconnect (LGX)
42	SS7 Links (DS0) Install
43	SS7 Links (DS0) Disconnect
44	SS7 Links (DS1) Install
45	SS7 Links (DS1) Disconnect
46	SS7 STP global title translations 'A Link' only Install
47	SS7 STP global title translations 'A Link' only Disconnect
48	SS7 STP message transfer part 'A Link' only (port) Install
49	SS7 STP message transfer part 'A Link' only (port) Disconnect

Element Type 1: POTS / ISDN BRI - Migration - TSR

Definition: POTS is Plain Old Telephone Service. ISDN/BRI is Integrated Services Digital Network/Basic Rate Interface.

Objective: Move an existing POTS or ISDN/BRI from an ILEC to a new entrant (CLEC).

Environment: TSR (see Model Description for TSR description)

Key Drivers of Cost:

Variable Input

- Labor Rate
- Variable Overhead
- Fallout %

Work Value Input

- Manual Work Step Times

High Level Process Overview:

Transmission Type: Analog ☒ Digital ☒.

Unbundled Loop: Yes ☐ No ☒.

Examples of services used on this element type:

Residence Line 1FR, 1MR
Business Line 1FB, 1MB

Time Estimates: Activity times are based on estimates provided by a panel of Subject Matter Experts.

Sample Output: See Attachment A

Detailed Work Activities: See Attachment B

The provisioning activities provide a high level overview of the OSS processing actions required to change an existing USOC (Universal Service Order Code) to a TSR USOC.

Migration includes revising/establishing a customer record for:

Billing - CRIS/CABS
Maintenance - LMOS/WFA
Corporate Database - NSDB

Fallout:

It is assumed that fallout of the order will occur 2% of the time. Manual assistance will be required from a center called the Recent Change Memory Administration Center (RCMAC). The activities include the following:

1. pull and analyze the order
2. clear the jeopardy

Fallout has been included to address situations where a customer requested changes such as; a pending order that has not yet been completed or a change in the effective date.

Element Type 2: POTS / ISDN BRI – (Install – TSR)

Definition: POTS is Plain Old Telephone Service. ISDN/BRI is Integrated Services Digital Network/Basic Rate Interface.

Objective: Install a POTS or ISDN/BRI service for a CLEC customer.

Environment: Installation TSR (see Model Description for TSR description)

Key Drivers of Cost:

Variable Input

- Labor Rate
- Variable Overhead
- Fallout %

Work Value Input

- Manual Work Step Times

High Level Process Overview:

Transmission Type: Analog ☐ Digital ☒.

Unbundled Loop: Yes ☐ No ☒.

Examples of services used on this element type:

Residence Line 1FR, 1MR
Business Line 1FB, 1MB

Time Estimates: Activity times are based on estimates provided by a panel of Subject Matter Experts.

Sample Output: See Attachment A

Detailed Work Activities: See Attachment B

Detailed Work Activity Descriptions:

The provisioning activities provide a high level overview of the OSS processing actions required to establish a USOC (Universal Service Order Code) for a TSR USOC.

Installation includes establishing a customer record for:

Billing - CRIS/CABS
Maintenance - LMOS/WFA
Corporate Database - NSDB

Fallout:

It is assumed that fallout of the order will occur 2% of the time. Manual assistance will be required from a center called the RCMAC. The activities include the following:

1. pull and analyze the order
2. clear the jeopardy

Fallout has been included to address situations where a customer requested changes such as; a pending order that has not yet been completed or a change in the effective date.

Element Type 3: POTS / ISDN BRI - Migration – (UNE-PLATFORM)

Definition: POTS is Plain Old Telephone Service. ISDN/BRI is Integrated Services Digital Network/Basic Rate Interface.

Objective: Move an existing POTS or ISDN/BRI from an ILEC to a new entrant (CLEC).

Environment: UNE-Platform (see Model Description for UNE-Platform description)

Key Drivers of Cost:

Variable Input

- Labor Rate
- Variable Overhead
- Fallout %

Work Value Input

- Manual Work Step Times

High Level Process Overview:

Transmission Type: Analog x Digital x.

Unbundled Loop: Yes___ No x.

Examples of services used on this element type:

Residence Line 1FR, 1MR
Business Line 1FB, 1MB
ISDN/BRI

Time Estimates: Activity times are based on estimates provided by a panel of Subject Matter Experts.

Sample Output: See Attachment A

Detailed Work Activities: See Attachment B

The provisioning activities provide a high level overview of the OSS processing actions required to change an existing USOC (Universal Service Order Code) to a UNE-Platform USOC.

Migration includes revising/establishing a customer record for:

Billing - CRIS/CABS
Maintenance - LMOS/WFA
Corporate Database - NSDB

Fallout:

It is assumed that fallout of the order will occur 2% of the time. Manual assistance will be required from a center called the Recent Change Memory Administration Center (RCMAC). The activities include the following:

1. pull and analyze the order
2. clear the jeopardy

Fallout has been included to address situations where a customer requested changes such as; a pending order that has not yet been completed or a change in the effective date.

Element Type 4: POTS / ISDN BRI - Install – (UNE-PLATFORM)

Definition: POTS is Plain Old Telephone Service. ISDN/BRI is Integrated Services Digital Network/Basic Rate Interface.

Objective: Move an existing POTS or ISDN/BRI from an ILEC to a new entrant (CLEC).

Environment: UNE-Platform (see Model Description for UNE-Platform description)

Key Drivers of Cost:

Variable Input

- Labor Rate
- Variable Overhead
- Fallout %

Work Value Input

- Manual Work Step Times

High Level Process Overview:

Transmission Type: Analog x Digital x.

Unbundled Loop: Yes No x.

Examples of services used on this element type:

Residence Line 1FR, 1MR
Business Line 1FB, 1MB.
ISDN/BRI

Time Estimates: Activity times are based on estimates provided by a panel of Subject Matter Experts.

Sample Output: See Attachment A

Detailed Work Activities: See Attachment B

The provisioning activities provide a high level overview of the OSS processing actions required to change an existing USOC (Universal Service Order Code) to a UNE-Platform USOC.

Migration includes revising/establishing a customer record and recent change for:

Billing - CRIS/CABS
Maintenance - LMOS/WFA
Corporate Database – NSDB
MARCH

Fallout:

It is assumed that fallout of the order will occur 2% of the time. Manual assistance will be required from a center called the Recent Change Memory Administration Center (RCMAC). The activities include the following:

1. pull and analyze the order
2. clear the jeopardy

Fallout has been included to address situations where a customer requested changes such as; a pending order that has not yet been completed or a change in the effective date.

Element Type 5: POTS / ISDN BRI - Disconnect – (TSR/UNE-PLATFORM)

Definition: POTS is Plain Old Telephone Service. ISDN/BRI is Integrated Services Digital Network/Basic Rate Interface.

Objective: Disconnect a POTS or ISDN/BRI circuit.

Environment: TSR or UNE-Platform (see Model Description for UNE-Platform description)

Key Drivers of Cost:

Variable Input

- Labor Rate
- Variable Overhead
- Fallout %

Work Value Input

- Manual Work Step Times

High Level Process Overview:

Transmission Type: Analog x Digital x.

Unbundled Loop: Yes No x.

Examples of services used on this element type:

Residence Line 1FR, 1MR
Business Line 1FB, 1MB.
ISDN/BRI

Time Estimates: Activity times are based on estimates provided by a panel of Subject Matter Experts.

Sample Output: See Attachment A

Detailed Work Activities: See Attachment B

The disconnect activities provide a high level overview of the OSS processing actions required to disconnect an existing USOC (Universal Service Order Code) of a TSR or UNE-Platform USOC.

Disconnect includes deleting a customer record and recent change for:

Billing - CRIS/CABS
Maintenance - LMOS/WFA
Corporate Database – NSDB
MARCH

Fallout:

It is assumed that fallout of the order will occur 2% of the time. Manual assistance will be required from a center called the Recent Change Memory Administration Center (RCMAC). The activities include the following:

1. pull and analyze the order
2. clear the jeopardy

Fallout has been included to address situations where a customer requested changes such as; a pending order that has not yet been completed or a change in the effective date.

Element Type 6 : POTS / ISDN BRI - Migration – (UNE – LOOP)

Definition: POTS is Plain Old Telephone Service. ISDN/BRI is Integrated Services Digital Network/Basic Rate Interface.

Objective: Move an existing POTS or ISDN/BRI from an ILEC to a new entrant (CLEC).

Environment: UNE - Loop (see Model Description for UNE-Loop description)

Key Drivers of Cost:

Variable Input

- Labor Rate
- Variable Overhead
- Fallout %
- Copper Loop Percentage
- Average Trip Time
- Number of Work Activities Per Trip
- CO Staffed Ratio

Work Value Input

- Manual Work Step Times

High Level Process Overview:

Transmission Type: Analog ☒ Digital ☒

Unbundled Loop: Yes ☒ No ☐

Examples of services used on this element type:

Residence Line 1FR, 1MR

Business Line 1FB, 1MB

Note: If TR-303 IDLC design is applied , the number of manual steps is reduced as well as associated cost.

Time Estimates: Activity times are based on estimates provided by a panel of Subject Matter Experts.

Sample Output: See Attachment A

Detailed Work Activities: See Attachment B

Technical Assumptions:

Central Office (CO) Crossconnects - 2 Wire Loops

This section of the documentation will discuss Copper Twisted Wire Pair (TWP) and TR-303 IDLC (Integrated Digital Loop Carrier). The cross connection for the unbundled loop assumes that the DOP (Dedicated Outside Plant) and the 2 Wire 6-Line NID are in place and the cost associated with these cross connections are recovered in the recurring rates. Thus, the manual activity (2 wire copper cross-connect) occurs only at the Central Office (CO). It is also assumed that travel to a non-staffed office may be required.²⁴ Times were established for each architecture. Once times were established, they were weighted by 40% and 60% for Copper TWP and TR-303 IDLC respectively. Copper is used for loop feeder lengths of 9kft or less and TR-303 IDLC is used for loop feeder lengths greater than 9kft. The cost modeling takes into recognition that the new entrant will purchase channelized DS1 capacity (virtual feeder) at the remote terminal for IDLC. In addition, the Model assumed labor rates associated with Non-Designed 2 Wire Loops. Lastly, the Model did not assume Circuit Provisioning Center (CPC) or Special Services Centers (SSC) because these centers are not associated with 2 Wire Loops.

²⁴ See Section 6 for a discussion of the assumptions for non-staff Central Offices.

2 Wire Copper CO Crossconnect for Loops Below 9 Kilofeet

2 Wire POTS and ISDN/BRI Loop Technical Description:

The following assumptions were made for a 2 Wire POTS and ISDN/BRI Loop:

- The unbundled 2-wire loops should have the capability of providing a minimum of 160 Kb/s total bandwidth. The unbundled loop should also be plastic insulated conductor (PIC) cable, with an estimated measured loss (EML) not to exceed 15,000 feet (15kFt), nominal 26 gauge, unloaded (NL) copper, equalization of 42dB at 40kHz at approximately 15kft, or provided as a virtual channel on a physical digital loop carrier (DLC) or similar digital copper or fiber facility that terminates on a loop concentrator or multiplexer.
- The unbundled loop(s) should also meet the standard ANSI interface to the network side of the network termination (NT1) customer premise equipment (CPE). When the loop is conditioned properly, the digital subscriber loop (DSL) should also have the capability to provide service for up to eight users on a multi-point interface on the customer side of the NT1 CPE²⁵.
- For detailed requirements and objectives on the characterization and attributes of access, transport, and subscriber loops for DSL services, you may refer to ST-TSY-000041, TR-NWT-000393, ANSI-T1.601-1992, TR-NWT-000397, ANSI-T1.604-1990, and/or other related technical reference specifications.

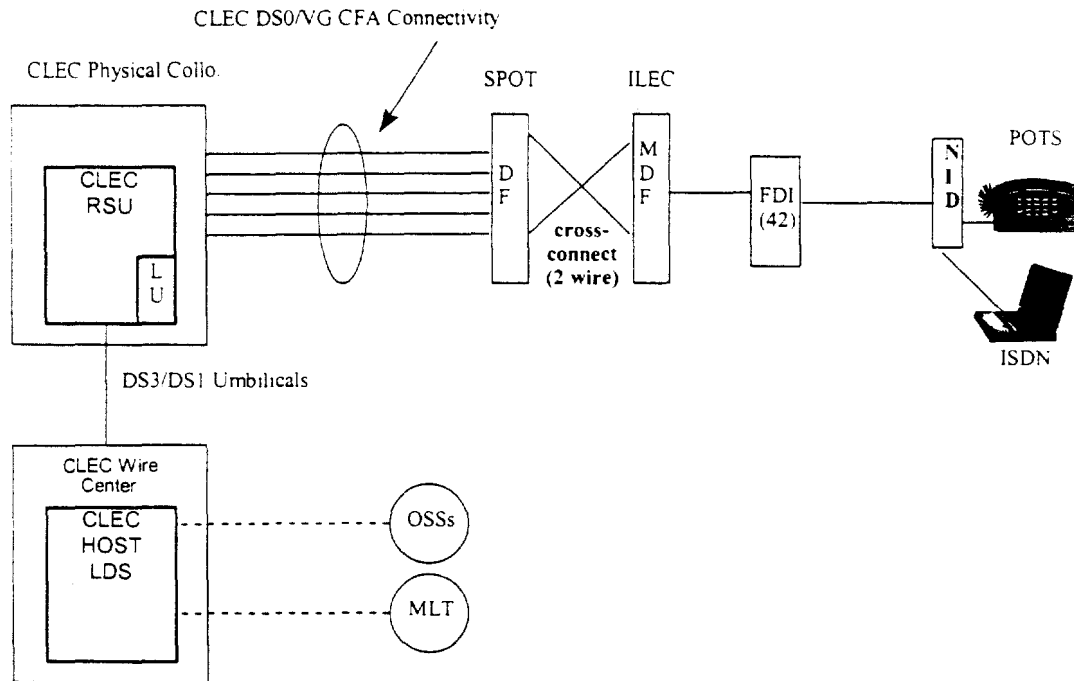
2 Wire POTS and ISDN/BRI Loop Technical Assumption:

The following schematic depicts the network elements that would be used to provide an unbundled Non-Designed 2 Wire Copper Loop²⁶ (POTS & ISDN/BRI).

²⁵ ISDN References include, but are not limited to: ST-TSY-000041, TR-NWT-000393, ANSI-T1.601-1992, TR-NWT-000397, ANSI-T1.604-1990.

²⁶ This schematic also represents an ISDN BRI loop feeder at less than 9 Kilofeet.

2 Wire Unbundled Copper Loop (= < 9kft.)



Migration:

- Use of WFA
- 4-Work Activities per trip
- Trip time to non-staffed CO
- Pull and analyze the order
- Terminate cross-connection from MDF to CFA on Low Profile Distribution Frame (LDPF (Cosmic-Type)) punch-down with short jumper concept, on non-congested frames, managed by an OSS
- Dial tone and ANI verification (from and to)
- Close the order

Fallout:

It is assumed that fallout of the order will occur 2% of the time. Manual assistance will be required from a center called the Loop Assignment Center ("LAC"). The activities include the following:

1. pull and analyze the order
2. clear the jeopardy

TR-303 IDLC for Loops Over 9 Kilofeet

Technical Description of TR-303 IDLC:

The TR-303 IDLC is a digital loop carrier which consists of a remote terminal (RT) and a transmission link. The COT (central office terminal) is eliminated and the functions it performed are integrated into the switch via the IDT (Integrated Digital Terminal) which is part of the switch. The "analog-to-digital" and "digital-to-analog" conversions performed by the COT and the switch Line Units are no longer required. Instead the signals are switched in their digital form. The schematic below depicts the network elements

that would be used to provide an unbundled TR-303 IDLC loop²⁷. The installation and disconnection of the TR-303 IDLC DS0 would be processor time. The new entrant would first purchase the channelized (virtual feeder) DS1 from the Virtual Remote Terminal to the new entrant collocation area. The ILEC would then, at the request of the new entrant, electronically "roll" (via an OSS) DS0 virtual channels on to the channelized (virtual feeder) DS1.

Technical Assumption:

Exhibit 2 depicts the network elements that would be used to provide an unbundled Non-Designed 2 Wire loop served over TR-303 IDLC²⁸. It is also assumed that the most forward-looking SONET-based TR-303 IDLC is modeled (e.g., Lucent Technologies SLC-2000 or DSC Litespan systems). The remote terminal (RT) is integrated into the switch, and the DS0 crossconnects are electronically provided at the time slot inter-change unit (TSI) on the RT via an upstream OSS (e.g., OPS/INE). Since the TR-303 IDLC is integrated into the LDS switch, there is no need for COT equipment, plug-in channel units, or 2-wire crossconnects at the MDF.

Other Technical Assumptions and Arguments:

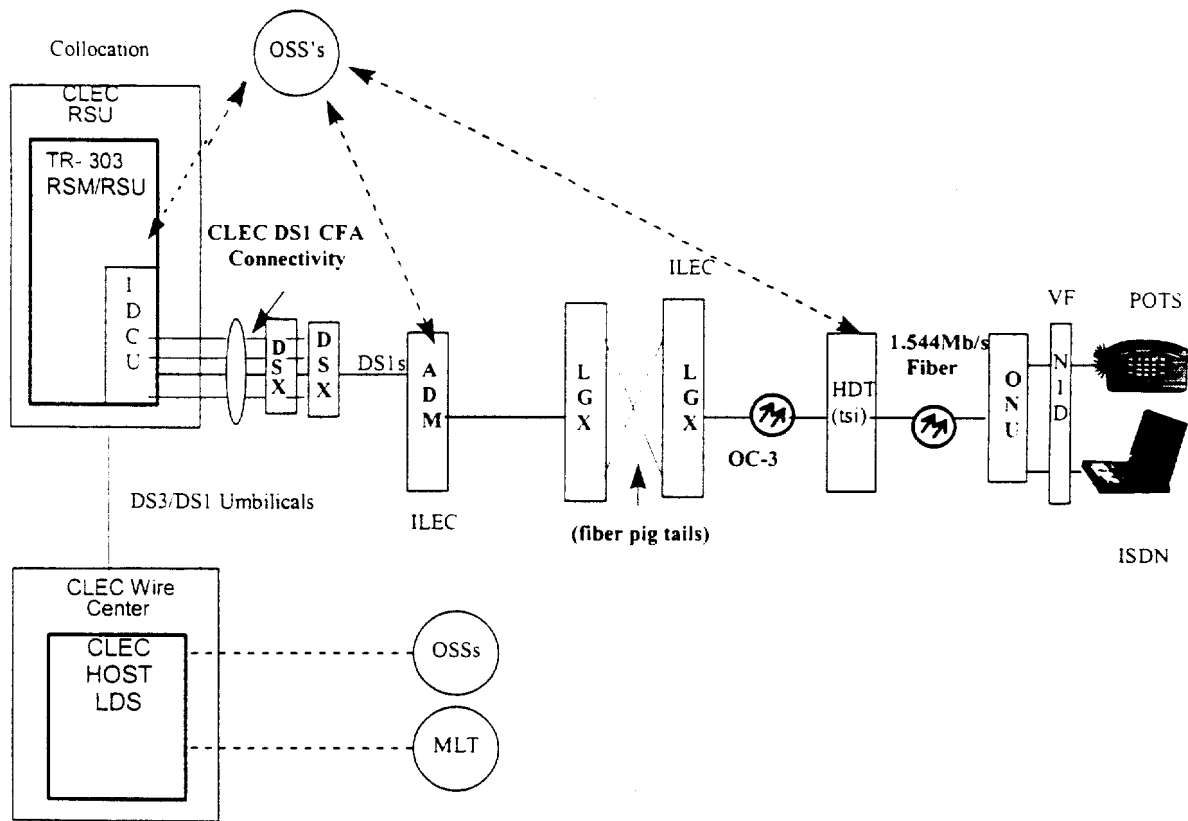
The Exhibit below depicts the network elements that are used to provide an unbundled loop using TR-303 IDLC. It also assumes that the DOP and NID are in place. After the CLEC purchases a Virtual Tributary DS1 (VT-1) on the ILEC OC-3 Fiber Feeder from the Remote Terminal ("RT") to the CLEC collocation space, the installation (and subsequent disconnection) of an unbundled loop would not require any manual effort. The appearance of any new or migrated virtual DS0 customer loop at the collocation area would be accomplished electronically using the appropriate OSSs and the functionality that is inherent in TR-303 IDLC systems. In other words, if the ILEC has 24 DS0 channels/customers on its Virtual Tributary DS1 (VT-1) and terminated on its Local Digital Switch (LDS) and one (1) customer decides to migrate to the CLEC, the ILEC would still retain the other 23 on their VT1 and LDS. If the second customer (DS0) decides to migrate to the CLEC, the ILEC would still retain the other 22 DS0s on its VT1 and LDS - and so on. It should be noted that in the above scenario, it is assumed that both VT1s are resident on the same ILEC Fiber Feeder (OC-3). Each OC-3 has the a total DS1 payload capacity - depending on electronics and configuration - of 84 VT1s.

This is not considered the same as sub-loop unbundling, because the CLEC in the above scenario is still using the same ILEC OC-3 Loop fiber feeder, and is simply grooming from one Virtual DS1 tributary or channel (VT1) to another Virtual DS1 tributary or channel within the same ILEC OC-3 fiber feeder. The DS0s are groomed via communications from a provisioning/recent change OSS to the electronic time slot interchange (TSI) at the remote terminal (RT). If the CLEC were to provide its own OC-3 or physical DS1 from their POP to the RT or Feeder Distribution Interface (FDI), then it may be considered as sub-loop Unbundling.

²⁷ This schematic also represents an ISDN BRI loop at less than 9 Kilofeet

²⁸ IDLC is described in detail in Bellcore GR-303-CORE-which is part of Bellcore Transport Systems Generic Requirements (TSGR), FR-440

TR-909 FITL Unbundling



Element Type 7: POTS / ISDN BRI; UNE-Loop (Install)

Definition: POTS is Plain Old Telephone Service. ISDN/BRI is Integrated Services Digital Network/Basic Rate Interface.

Objective: Install a POTS or ISDN/BRI service for a CLEC customer.

Environment: Installation UNE-Loop (see Model Description for UNE-Loop description)

Key Drivers of Cost:

Variable Input

- Labor Rate
- Variable Overhead
- Fallout
- Copper Loop Percentage
- Average Trip Time
- Number of Work Activities per Trip
- CO Staffed Ratio

Work Value Input

- Manual Work Step Times

High Level Process Overview:

Transmission Type: Analog ☒ Digital ☒.

Unbundled Loop: Yes ☒ No ☐.

Examples of services used on this element type:

- Residence Line 1FR, 1MR
- Business Line 1FB, 1MB.

Time Estimates: Activity times are based on estimates by a panel of Subject Matter Experts.

Sample Output: See Attachment A

Detailed Work Activities: See Attachment B

Detailed Work Activity Descriptions:

Technical Assumptions:

Central Office (CO) Crossconnects - 2 Wire Loops

This section of the documentation will discuss Copper twisted wire pair (TWP) and TR-303 IDLC (Integrated Digital Loop Carrier). The cross connection for the unbundled loop assumes that the DOP (Dedicated Outside Plant see section 18) and the 2 Wire 6-Line NID are in place and the cost associated with these cross connections are recovered in the recurring rates. Thus, the manual activity (2 wire copper cross-connect) occurs only at the Central Office. It is also assumed that travel to a non-staffed office may be required.²⁹ Times were established for each architecture. Once times were established, they were weighted by 40% and 60% for Copper TWP and TR-303 IDLC respectively. Copper is used for loop feeder lengths of 9kft or less and TR-303 IDLC is used for loop feeder lengths greater than 9kft. The cost modeling takes into recognition that the new entrant will purchase channelized DS1 capacity (virtual feeder) at the remote terminal for IDLC. In addition, the Model assumed labor rates associated with Non-Designed 2 Wire Loops. Lastly, the Model did not assume

²⁹ See Section 6 for a discussion of the assumptions for non-staff Central Offices.

NRCM TECHNICAL ASSUMPTIONS BINDER (NTAB)
WORKING DRAFT IN PROGRESS

Circuit Provisioning Center (CPC) or Special Services Centers (SSC) because these centers are not associated with 2 Wire Loops.

2 Wire Copper CO Crossconnect for Loops at or Below 9 Kilofeet

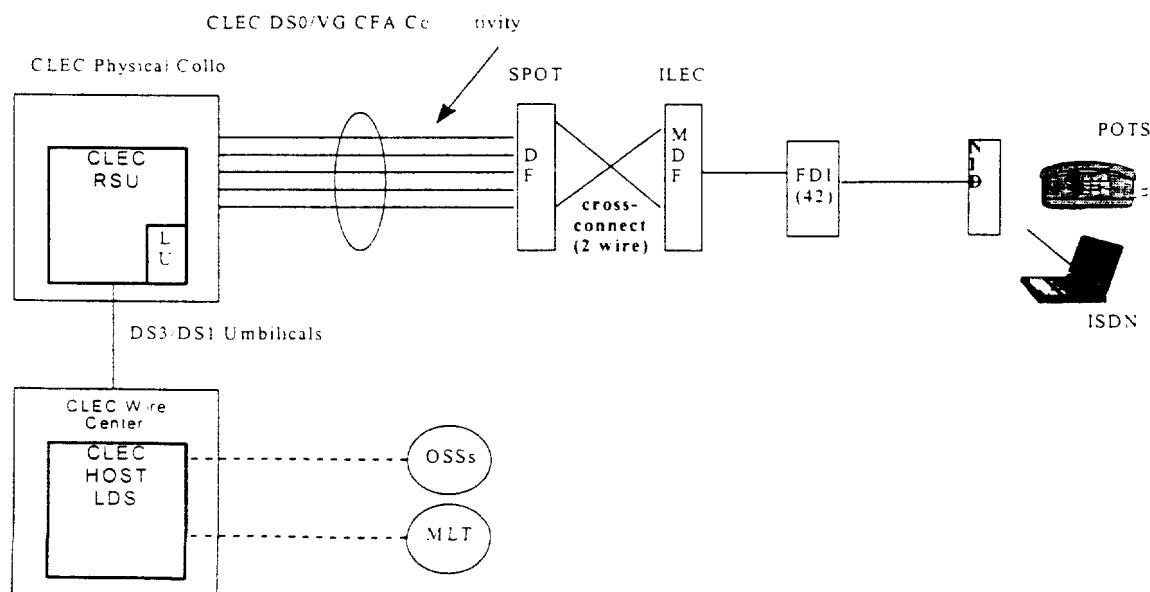
2 Wire POTS and ISDN/BRI Loop Technical Description:

The following assumptions were made for a 2 Wire POTS and ISDN/BRI Loop:

- The unbundled 2-wire loops should have the capability of providing a minimum of 160 Kb/s total bandwidth. The unbundled loop should also be plastic insulated conductor (PIC) cable, with an estimated measured loss (EML) not to exceed 15,000 feet (15kFt), nominal 26 gauge, unloaded (NL) copper, equalization of 42dB at 40kHz at approximately 15kFt, or provided as a virtual channel on a physical digital loop carrier (DLC) or similar digital copper or fiber facility that terminates on a loop concentrator or multiplexer.
- The unbundled loop(s) should also meet the standard ANSI interface to the network side of the network termination (NT1) customer premise equipment (CPE). When the loop is conditioned properly, the digital subscriber loop (DSL) should also have the capability to provide service for up to eight users on a multi-point interface on the customer side of the NT1 CPE.
- For detailed requirements and objectives on the characterization and attributes of access, transport, and subscriber loops for DSL services, you may refer to ST-TSY-000041, TR-NWT-000393, ANSI-T1.601-1992, TR-NWT-000397, ANSI-T1.604-1990, and/or other related technical reference specifications.

The schematic below depicts the network elements that would be used to provide an unbundled Non-Designed 2 Wire Copper Loop³⁰ (POTS & ISDN/BRI).

2 Wire Unbundled Copper Loop (= < 9kft.)



Installation:

³⁰ This schematic also represents an ISDN BRI loop feeder at less than 9 Kilofeet.

NRCM TECHNICAL ASSUMPTIONS BINDER (NTAB)
WORKING DRAFT IN PROGRESS

- Use of WFA
- 4-Work Activities per trip
- Trip time to non-staffed CO
- Pull and analyze the order
- Terminate cross-connection from MDF to CFA appearance on Low Profile Distribution Frame (LDPF (Cosmic-Type)) punch-down with short jumper concept, on non-congested frames, managed by an OSS
- ANI Continuity verification
- Close the order

Fallout:

It is assumed that fallout of the order will occur 2% of the time. Manual assistance will be required from a center called the Loop Assignment Center ("LAC"). The activities include the following:

1. pull and analyze the order
2. clear the jeopardy

TR-303 IDLC for Loops Over 9 Kilofeet

Technical Description of TR-303 IDLC:

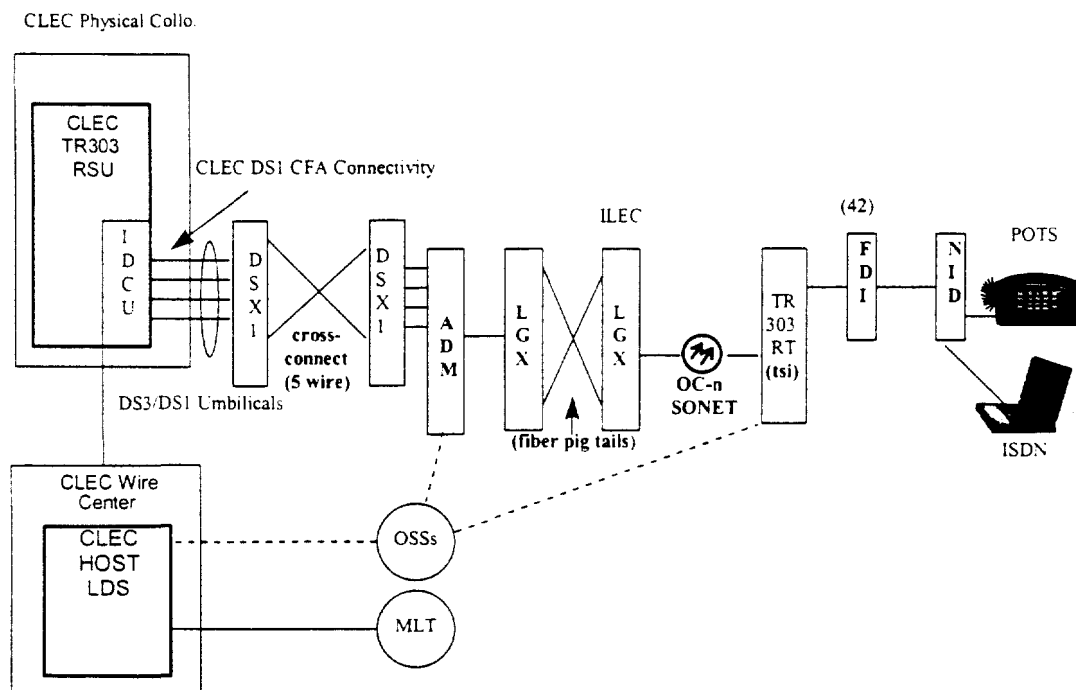
The TR-303 IDLC is a digital loop carrier which consists of a remote terminal (RT) and a transmission link. The COT (central office terminal) is eliminated and the functions it performed are integrated into the switch via the IDT (Integrated Digital Terminal) which is part of the switch. The "analog-to-digital" and "digital-to-analog" conversions performed by the COT and the switch Line Units are no longer required. Instead the signals are switched in their digital form. The schematic in exhibit 2 depicts the network elements that would be used to provide an unbundled TR-303 IDLC loop³¹. The installation and disconnection of the TR-303 IDLC DS0 would be processor time. The new entrant would first purchase the channelized (virtual feeder) DS1 from the Virtual Remote Terminal to the new entrant collocation area. The ILEC would then, at the request of the new entrant, electronically "roll" (via an OSS) DS0 virtual channels on to the channelized (virtual feeder) DS1.

The following schematic depicts the network elements that would be used to provide an unbundled Non-Designed 2 Wire loop served over TR-303 IDLC³². It is also assumed that the most forward-looking SONET-based TR-303 IDLC is modeled (e.g., Lucent Technologies SLC-2000 or DSC Litespan systems). The remote terminal (RT) is integrated into the switch, and the DS0 crossconnects are electronically provided at the time slot inter-change unit (TSI) on the RT via an upstream OSS (e.g., OPS/INE). Since the TR-303 IDLC is integrated into the LDS switch, there is no need for COT equipment, plug-in channel units, or 2-wire crossconnects at the MDF.

³¹ This schematic also represents an ISDN BRI loop at less than 9 Kilofeet.

³² IDLC is described in detail in Bellcore GR-303-CORE - which is part of Bellcore Systems Generic Requirements (TSGR), FR-440.

2 Wire Unbundled TR-303 (IDLC) Loop (> 9kft.)



Installation:

OSS & INE CPU time only (assumes channelized [virtual feeder] DS1 in place)

It is assumed that fallout of the order will occur 2% of the time. Manual assistance will be required from a center called the Loop Assignment Center ("LAC"). The activities include the following:

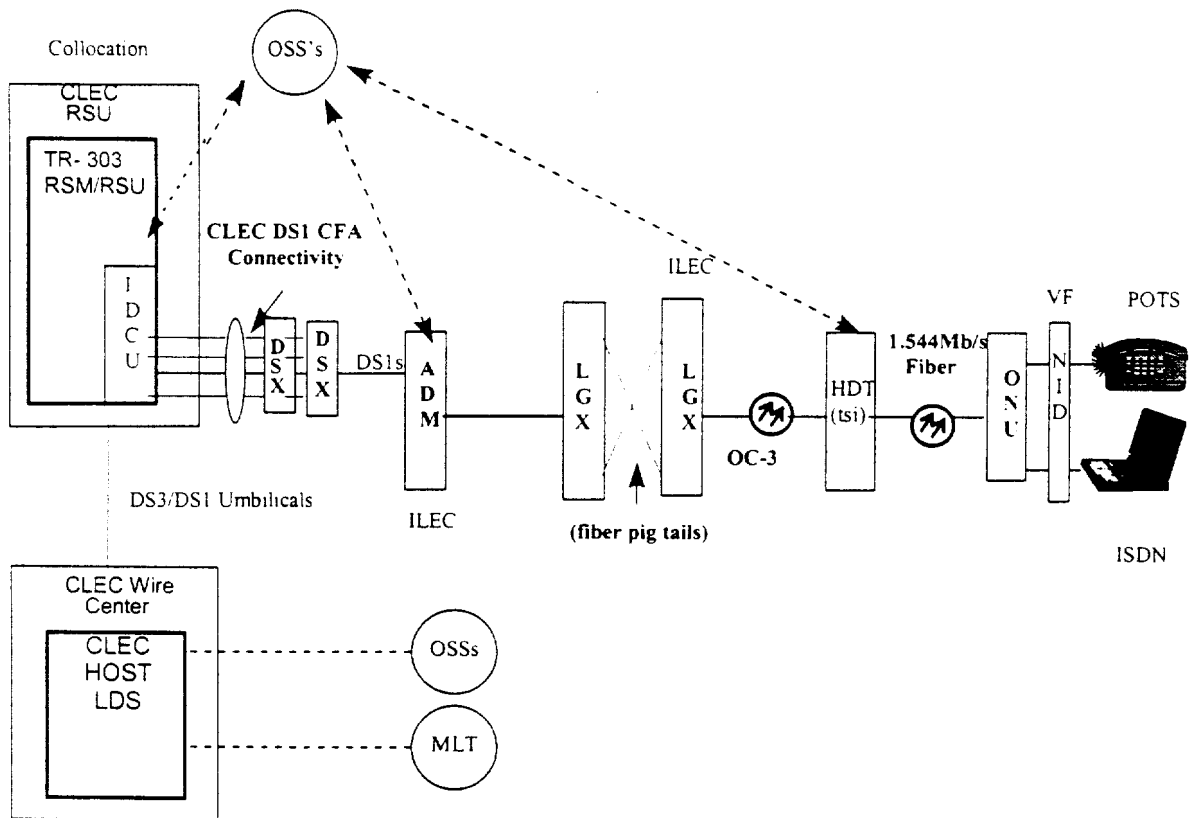
1. pull and analyze the order
2. clear the jeopardy

The scenario above utilizes TR-303 IDLC technology. Fallout reflects an absolute maximum because in the event there is a change in the network element (e.g., NE cross-connects or equipment), the NE will autonomously report the changes to the upstream OSS system (i.e., OPS/INE). The databases then remain in synch and reflect changes and updates identified by the NEs. In addition, it is further assumed that the automatic back-up and restore function is set on the NE so that the OSS can perform scheduled upload audits of the NE on a daily basis.

Technical Description of FITL (Fiber In The Loop)

FITL TR-909 is another application of the TR-303 platform where a Host Digital Terminal (HDT) is located at the CEV, 80 Type (Lucent) Cabinet, Central Office or Wire Center. The Fiber Feeder is extended to the curb or backyard of the subscriber. The fiber is then terminated on an Optical Network Unit (ONU) which can typically serve four, eight, twelve, twenty four or forty eight customers over short non-loaded loops which typically average about 500 feet.

TR-909 FITL Unbundling



Element Type 8: POTS / ISDN BRI - Disconnect – (UNE Loop)

Definition: POTS is Plain Old Telephone Service. ISDN/BRI is Integrated Services Digital Network/Basic Rate Interface.

Objective: Disconnect a POTS or ISDN/BRI service for a CLEC customer.

Environment: Disconnection UNE-Loop (see Model Description for UNE-Loop description)

Key Drivers of Cost:

Variable Input

- Labor Rate
- Variable Overhead
- Fallout
- Copper Loop Percentage
- Average Trip Time
- Number of Work Activities per Trip
- CO Staffed Ratio

Work value Input

- Manual Work Step Times

High Level Process Overview:

Transmission Type: Analog ☒ Digital ☒.

Unbundled Loop: Yes ☒ No ☐.

Examples of services used on this element type:

Residence Line 1FR, 1MR
Business Line 1FB, 1MB

Time Estimates: Activity times are based on estimates provided by a panel of Subject Matter Experts.

Sample Output: See Attachment A

Detailed Work Activities: See Attachment B

Detailed Work Activity Descriptions:

This element was modeled to detail the activities required ONLY if and when a CLEC initiated a request to have the loop disassembled. If the CLEC wishes to retain the loop, this element DOES NOT OCCUR.

Technical Assumptions:

Central Office (CO) Crossconnects - 2 Wire Loops

This section of the documentation will discuss Copper Twisted Wire Pair (TWP) and TR-303 IDLC (Integrated Digital Loop Carrier). The cross connection for the unbundled loop assumes that the DOP (Dedicated Outside Plant see section 18) and the 2 Wire 6-Line NID are in place and the cost associated with these cross connections are recovered in the recurring rates. Thus, the manual activity (2 wire copper cross-connect) occurs only at the Central Office. It is also assumed that travel to a non-staffed office may be required.³³ Times were established for each architecture. Once times were established, they were weighted by 40% and 60% for Copper TWP and TR-303 IDLC respectively. Copper is used for loop feeder lengths of 9kft or less and TR-303 IDLC is used for loop feeder lengths greater than 9kft. The cost modeling takes into recognition that the new entrant will purchase

³³ See Section 6 for a discussion of the assumptions for non-staff Central Offices.

channelized DS1 capacity (virtual feeder) at the remote terminal for IDLC. In addition, the Model assumed labor rates associated with Non-Designed 2 Wire Loops. Lastly, the Model did not assume Circuit Provisioning Center (CPC) or Special Services Centers (SSC) because these centers are not associated with 2 Wire Loops.

2 Wire Copper CO Crossconnect for Loops Below 9 Kilofeet

2 Wire POTS and ISDN/BRI Loop Technical Description:

The following assumptions were made for a 2 Wire POTS and ISDN/BRI Loop:

- The unbundled 2-wire loops should have the capability of providing a minimum of 160 Kb/s total bandwidth. The unbundled loop should also be plastic insulated conductor (PIC) cable, with an estimated measured loss (EML) not to exceed 15,000 feet (15kFt), nominal 26 gauge, unloaded (NL) copper, equalization of 42dB at 40kHz at approximately 15kFt, or provided as a virtual channel on a physical digital loop carrier (DLC) or similar digital copper or fiber facility that terminates on a loop concentrator or multiplexer.
- The unbundled loop(s) should also meet the standard ANSI interface to the network side of the network termination (NT1) customer premise equipment (CPE). When the loop is conditioned properly, the digital subscriber loop (DSL) should also have the capability to provide service for up to eight users on a multi-point interface on the customer side of the NT1 CPE.
- For detailed requirements and objectives on the characterization and attributes of access, transport, and subscriber loops for DSL services, you may refer to ST-TSY-000041, TR-NWT-000393, ANSI-T1.601-1992, TR-NWT-000397, ANSI-T1.604-1990, and/or other related technical reference specifications.

2 Wire POTS and ISDN/BRI Loop Technical Assumption:

The figure below (2 Wire Unbundled Copper Loop [= <9kft] depicts the network elements that would be used to provide an unbundled Non-Designed 2 Wire copper loop³⁴ (POTS & ISDN/BRI).

Disconnect:

- Use of WFA
- Pull and analyze the order
- Trip time to non-staffed CO
- 4-Work Activities per trip
- Disconnect cross-connection Low Profile Distribution Frame (LDPF (Cosmic-Type)) punch-down with short jumper concept on non-congested frames, managed by an OSS
- Close the order

Fallout:

It is assumed that fallout of the order will occur 2% of the time. Manual assistance will be required from a center called the Loop Assignment Center ("LAC"). The activities include the following:

1. pull and analyze the order
2. clear the jeopardy

Technical Assumptions:

TR-303 IDLC for Loops Over 9 Kilofeet

Technical Description of TR-303 IDLC:

The TR-303 IDLC is a digital loop carrier which consists of a remote terminal (RT) and a transmission link. The COT (central office terminal) is eliminated and the functions it performed are integrated into the switch via the IDT (Integrated Digital Terminal) which is part of the switch. The "analog-to-digital" and

³⁴ This schematic also represents an ISDN BRI loop feeder at less than 9 Kilofeet.

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"digital-to-analog" conversions performed by the COT and the switch Line Units are no longer required. Instead the signals are switched in their digital form. The schematic in exhibit 2 depicts the network elements that would be used to provide an unbundled TR-303 IDLC loop³⁵. The installation and disconnection of the TR-303 IDLC DS0 would be processor time. The new entrant would first purchase the channelized (virtual feeder) DS1 from the Virtual Remote Terminal to the new entrant collocation area. The ILEC would then, at the request of the new entrant, electronically "roll" (via an OSS) DS0 virtual channels on to the channelized (virtual feeder) DS1.

The install figure (2 Wire Unbundled TR-303 IDLC [=9kft]) depicts the network elements that would be used to provide an unbundled Non-Designed 2 Wire loop served over TR-303 IDLC³⁶. It is also assumed that the most forward-looking SONET-based TR-303 IDLC is modeled (e.g., Lucent Technologies SLC-2000 or DSC Litespan systems). The remote terminal (RT) is integrated into the switch, and the DS0 crossconnects are electronically provided at the time slot inter-change unit (TSI) on the RT via an upstream OSS (e.g., OPS/INE). Because the TR-303 IDLC is integrated into the LDS switch, there is no need for COT equipment, plug-in channel units, or 2-wire crossconnects at the MDF.

Disconnect:

OSS & INE CPU time only (assumes channelized [virtual feeder] DS1 in place)

Fallout:

It is assumed that fallout of the order will occur 2% of the time. Manual assistance will be required from a center called the Loop Assignment Center ("LAC"). The activities include the following:

1. pull and analyze the order
2. clear the jeopardy

The scenario above utilizes TR-303 IDLC technology. Fallout reflects an absolute maximum because in the event there is a change in the network element (e.g., NE cross-connects or equipment), the NE will autonomously report the changes to the upstream OSS system (i.e., OPS/INE). The databases then remain in synch and reflect changes and updates identified by the NEs. In addition, it is further assumed that the automatic back-up and restore function is set on the NE so that the OSS can perform scheduled upload audits of the NE on a daily basis.

Technical Description of FITL (Fiber In The Loop)

FITL TR-909 is another application of the TR-303 platform where a Host Digital Terminal (HDT) is located at the CEV, 80 Type (Lucent) Cabinet, Central Office or Wire Center. The Fiber Feeder is extended to the curb or backyard of the subscriber. The fiber is then terminated on an Optical Network Unit (ONU) which can typically serve four, eight, twelve, twenty four or forty eight customers over short non-loaded loops which typically average about 500 feet.

³⁵ This also represents an ISDN BRI loop at less than 9 Kilofeet.

³⁶ IDLC is described in detail in Bellcore GR-303-CORE - which is part of Bellcore Transport Systems Generic Requirements (TSGR), FR-440.

Element Type 9: Feature Changes

Definition: This element type includes changes to existing services such as adding a feature to a subscriber's line (e.g., call waiting, call answer, etc.)

Objective: Add/delete vertical feature to/from existing service.

Environment: Change (see Model Description for Change description)

Key Drivers of Cost:

Variable Input

- Labor Rate
- Variable Overhead
- Fallout

Work Value Input

- Manual Work Step Times

High Level Process Overview:

Transmission Type: Analog__ Digital__.

Unbundled Loop: Yes__ No__

Examples of service used on this element type:

Add/Delete a subscriber line feature (e.g.; call waiting, call display, call forward, etc.).

Time Estimates: Activity times are based on estimates provided by a panel of Subject Matter Experts.

Sample Output: See Attachment A

Detailed Work Activities: See Attachment B

Detailed Work Activity Descriptions:

Technical Description:

This element models recent change translations to add local switching features, including but not limited to call forwarding, call waiting, three way calling, caller ID, CLASS, etc. It is assumed that 98% of the orders will flow through from the service order processor (SOP) down to an including the MARCH OSS system and to the local digital switch (LDS).

OSS and INE Flow-Through Technical Assumptions:

Generally, the service order flow for OSS and INE is as follows and is illustrated below:

1. The Service Order Processor ("SOP") sends the order to the Service Order Analysis & Control System ("SOAC"). SOAC analyzes the order and determines if assignments or updates are necessary to outside plant (assignments/updates), interoffice facilities or central office equipment (assignments/updates), and whether local digital switch (recent change translations) functions are needed. If required, SOAC then generates an assignment request and sends it to the appropriate Provisioning Systems (e.g., Computer System for Mainframe Operations [COSMOS], Loop Facility Assignment and Control System [LFACS], Trunk Inventory and Record Keeping System [TIRKS], etc.). It should be noted here, that in the case of a simple customer change request (e.g., "as is" ³⁷

³⁷ "As Is" means that the existing customer and their services are in place today and will remain identical.

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Total Service Resale, Unbundled Network Element Platform, Soft Dial Tone³⁸), there is no need to access any down-stream systems via SOAC because all facilities are already in place. Thus, the only cost associated with this activity is processor time.

2. The Provisioning Systems (e.g. Memory Administration/Recent Change) respond with assignments or updates and SOAC formulates the Element Management System ("EMS"), and Provisioning Systems Translation Packets and Messages based upon the component response data.
3. SOAC electronically sends the Translation Packets and Messages to EMS, and/or Provisioning Systems (e.g., Memory Administration Recent Change [MARCH] and Operations Processor System for Intelligent Network Elements [OPS/INE].
4. The Provisioning Systems and/or EMS electronically sends Translation Packets and Recent Change Messages to the Local Digital Switching Systems ("LDS")³⁹, Digital Cross-connect Systems ("DCS")⁴⁰, and/or other Stored Program or Processor Controlled Network Elements ("PCNE"). The EMS⁴¹ also sends Translation Packets or Recent Change Messages to the Integrated Digital Loop Carrier ("IDLC")⁴², Automated Digital Terminal Systems ("ADTS")⁴³, Fiber in The Loop ("FITL")⁴⁴, SONET ADM/LTE⁴⁵ or other Processor Controlled Intelligent Digital Loop Carrier ("DLC")⁴⁶.
5. Upon receipt of the Message or Translation Packets, the EMS, Provisioning Systems, and Processor Controlled Network Element ("PCNE") will respond in one of two ways:
 - (a) The first is a positive acknowledgment that the Translation Packets or Messages received have been worked successfully. Assuming a positive acknowledgment response, service is normally provisioned within 2.0 seconds.
 - (b) The second is an error acknowledgment (fallout) sent to SOAC to indicate that the EMS, PCNE, and/or Provisioning Systems were unable to translate the Translation Packet or Message

³⁸ Soft Dial Tone is where the circuit facilities and the switch port are not reassigned, but are left in place even though the premises is vacated.

³⁹ LDS requirements and objectives are found in modules of Bellcore's LSSGR; FR-64.

⁴⁰ DCS requirements and objectives can be found in Bellcore's TR-NWT-000170.

⁴¹ EMS requirements, objectives, and interface specifications can be found in Bellcore's GR-2869-CORE & FR-439.

⁴² IDLC requirements and objectives can be found in TR-TSY-000303 and GR-303-CORE.

⁴³ ADTS requirements and objectives can be found in Bellcore's TR-TSY-000174.

⁴⁴ FITL requirements and objectives can be found in Bellcore's TA-NWT-000909.

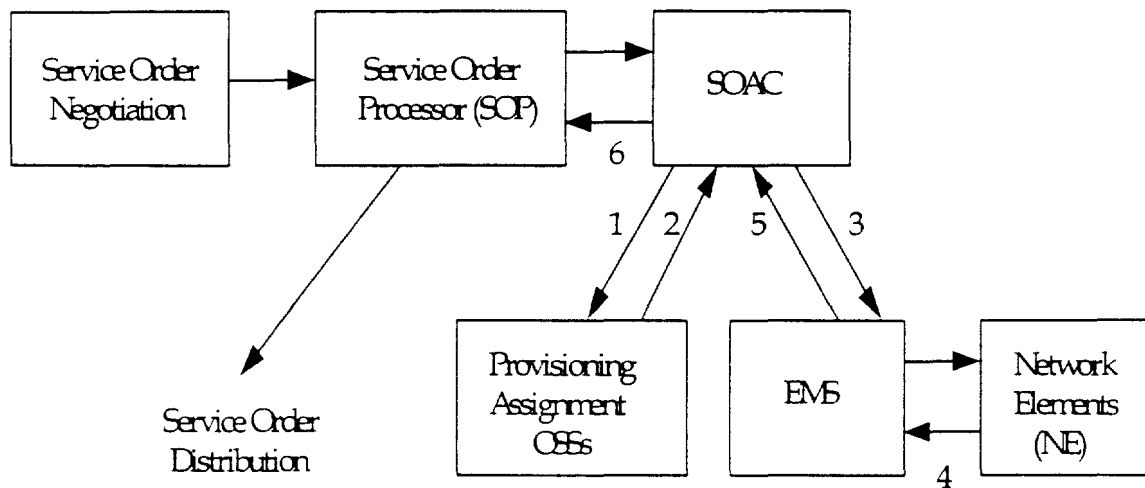
⁴⁵ SONET requirements and objectives can be found in Bellcore's GR-253-CORE of FR-440 (TSGR).

⁴⁶ DLC requirements and objectives can be found in Bellcore's TR-NWT-000057.

successfully. If this occurs, the order falls out of the system, the error(s) are resolved and the order is re-input into the process.

6. Assuming successful flow-through (no fallout or RMA), SOAC stores EMS, PCNE, and/or Provisioning Systems requests/responses in its databases for use of reports and inquiries. SOAC also sends the assignment section to the service order processor ("SOP"), and completions are automatically posted in the affected OSS Systems (e.g., Provisioning Systems, Work Management Systems, and Billing Systems, etc.)

High Level Provisioning Flow



Excerpts from Bellcore SR-OPT-001942, Issue 1; Service Order Analysis and Control (SOAC), Interface to Intelligent Loop Administration System

Installation:

- Assumes remote flow-through (MARCH) OSS CPU time

Fallout:

It is assumed that fallout of the order will occur 2% of the time to the RCMAC. The activities include the following:

- Pull and analyze the order
- Clear the jeopardy

Element Type 10: 4 Wire Migration – (UNE-Loop)

Definition: A 4 Wire circuit is a designed point-to-point conditioned circuit that may require special operational parameters (i.e., frequency response, Errored seconds, BER, envelope delay, noise, etc.) over and above that required by a normal 2 Wire circuit.

Objective: Move an existing 4 Wire local loop service from an ILEC to a new entrant (CLEC).

Environment: Migration - UNE-Loop (see Model Description for UNE-Loop description)

Key Drivers of Cost:

Variable Input

- Labor Rate
- Variable Overhead
- Fallout
- Copper Loop Percentage
- Average Trip Time
- Number of Work Activities per Trip
- CO Staffed Ratio
-

Work Value Input

- Manual Work Step Times

High Level Process Overview:

Transmission Type: Analog ☒ Digital ☒.

Unbundled Loop: Yes ☒ No ☐.

Examples of services used on this element type:

Digital Data Service (DDS)
HDSL
VF Data
PBX Tie Trunks

Time Estimates: Activity times are based on estimates by a panel of Subject Matter Experts.

Sample Output: See Attachment A

Detailed Work Activities: See Attachment B

Detailed Work Activity Descriptions:

Technical Description:

4 Wire Loop

One exception to non-designed loops is the 4 Wire loop, which by its very nature, constitutes a designed service/circuit. If the 4 Wire loop serves the end-user from the same CO or wire center, SMAS test points are modeled with the appropriate 4 Wire crossconnects.

Migration on Copper:

- Use of WFA
- 4-Work Activities per trip
- Trip time to non-staffed CO
- Pull and analyze the order (NTEC)
- Pull and analyze the order (SSC)

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- Negotiate customer release with CLEC (SSC)
- Travel time to the Central Office (NTEC)
- Travel time within staffed CO (NTEC)
- Monitor circuit for traffic busy and assignment (NTEC)
- Disconnect existing crossconnect (NTEC)
- Terminate cross-connects on LDPF (Cosmic-Type) frame (NTEC)
- Conduct testing (1000 Hz) (SSC)
- Close the order (NTEC)
- Close the Order (SSC)

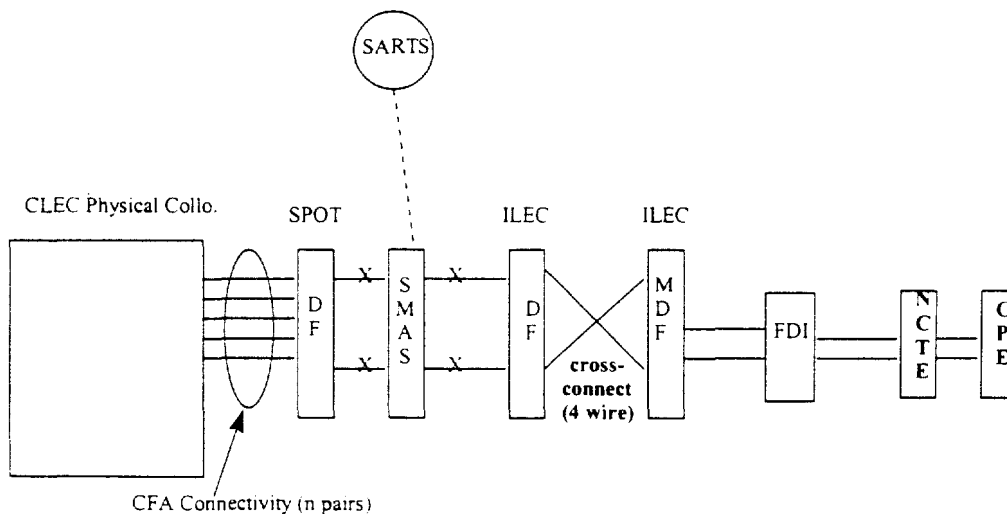
Fallout:

It is assumed that fallout of the order will occur 2% of the time to the CPC Center because it is a designed service. The activities include the following:

- Pull and analyze the order
- Clear the jeopardy

4-Wire Loop (Same CO)

4 Wire Unbundled Copper Loop



4 Wire Loop on IDLC (Fiber)

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Migration on IDLC:

- Use of WFA
- 4-Work Activities per trip
- Trip time to non-staffed CO
- Travel time within the CO
- Pull and analyze the order (SSC)
- Negotiate customer release with CLEC (SSC)
- Close the order (SSC)

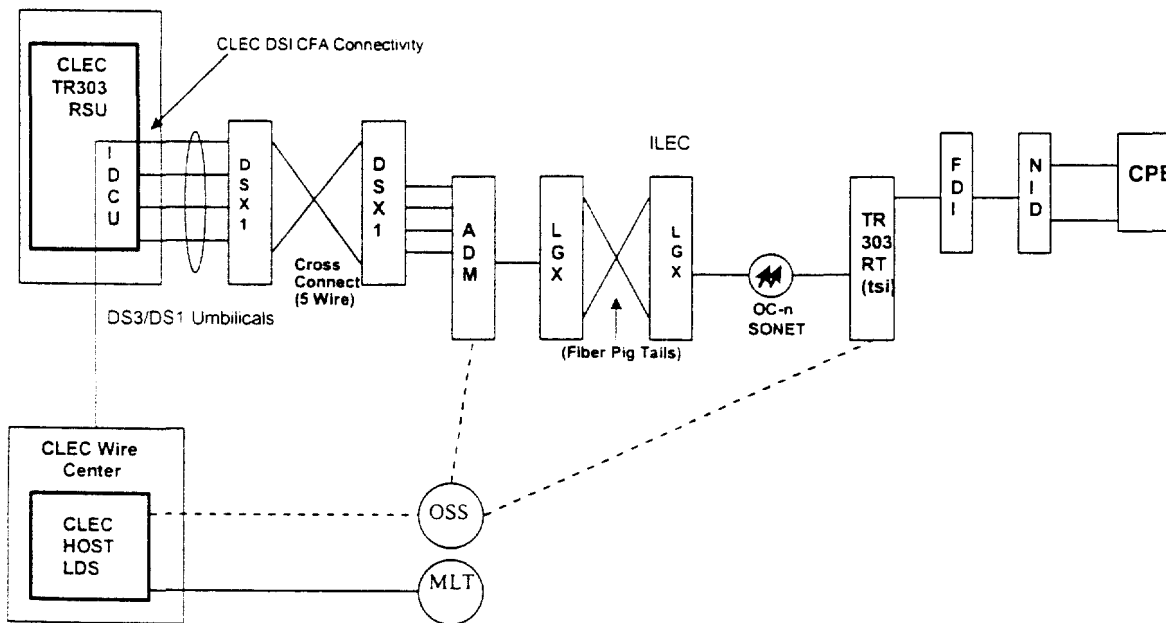
Fallout:

It is assumed that fallout of the order will occur 2% of the time to the CPC Center because it is a designed service. The activities include the following:

- Pull and analyze the order
- Clear the jeopardy - Manual design process

4 Wire Unbundled TR- 303 (IDLC) Loop (=> 9kft)

CLEC Physical Conlo



Element Type 11: 4 Wire - Install – (UNE-Loop)

Definition: A 4 Wire circuit is a designed point-to-point circuit that requires special operational parameters (i.e., more demanding frequency response, envelope delay, noise, etc.) over and above that required by a normal 2 wire POTS type circuit.

Objective: Install a 4 Wire Local Loop service for a CLEC customer.

Environment: Installation UNE-Loop (see Model description for UNE-Loop description)

Key Drivers of Cost:

Variable Input

- Labor Rate
- Variable Overhead
- Fallout
- Copper Loop Percentage
- Average Trip Time
- Number of Work Activities per Trip
- CO Staffed Ratio

Work Value Input

- Manual Work Step Times

High Level Process Overview:

Transmission Type: Analog ☒ Digital ☒.

Unbundled Loop: Yes ☒ No ☐.

Examples of service used on this element type:

DDS
VF Data
PBX Tie Trunk
HDSL

Time Estimates: Activity times are based on estimates provided by a panel of Subject Matter Experts.

Sample Output: See Attachment A

Detailed Work Activities: See Attachment B

Detailed Work Activity Descriptions:

Technical Description:

4 Wire Loop

One exception to non-designed loops is the 4 Wire loop, which by its very nature, constitutes a designed service/circuit. If the 4 Wire loop serves the end-user from the same CO or wire center, SMAS test points are modeled with the appropriate 4 Wire crossconnects.

Installation on Copper:

- Use of WFA
- Pull and analyze the order (NTEC)
- Pull and analyze the order (SSC)

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- 4-Work Activities per trip
- Trip time to non-staffed CO
- Travel time within the non-staffed CO
- Terminate cross-connects on LDPF (Cosmic-Type) frame
- Terminate cross-connects on SMAS test points
- Conduct testing - 1000Hz.
- SSC coordination testing
- Close the order (NTEC)
- Close the order (SSC)

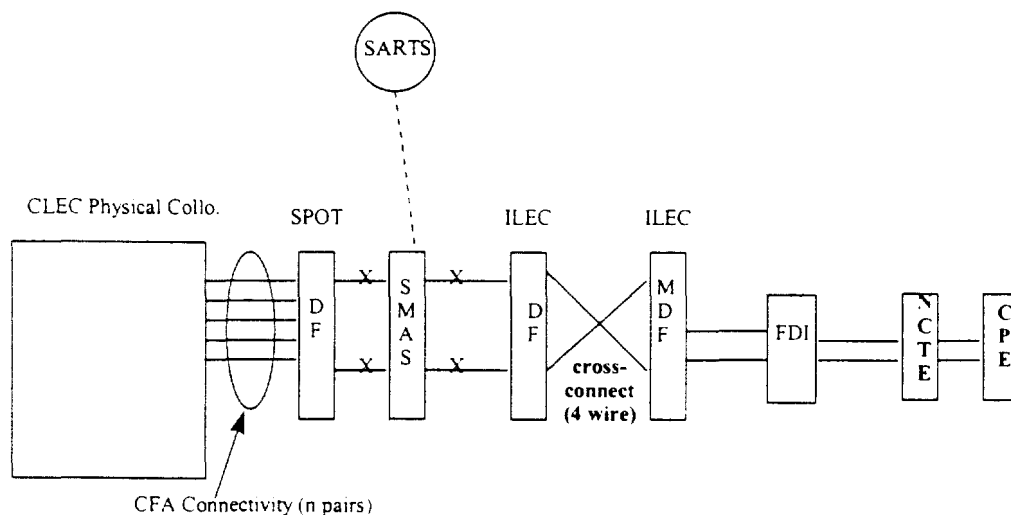
Fallout:

It is assumed that fallout of the order will occur 2% of the time to the CPC Center because it is a designed service. The activities include the following:

- Pull and analyze the order
- Clear the jeopardy

4-Wire Loop (Same CO)

4 Wire Unbundled Copper Loop



4 Wire Loop on IDLC

4-Wire TR-303 IDLC Loop (same CO)

Installation:

- Use of WFA
- Pull and analyze the order (SSC)
- Install DS0 TSI at RT (CPU time)
- Assumes unitized SMAS on AD4
- Close the order (SSC)

Fallout:

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It is assumed that fallout of the order will occur 2% of the time to the CPC Center because it is a designed service. The activities include the following:

- Pull and analyze the order
- Clear the jeopardy

4 Wire Unbundled TR- 303 (IDLC) Loop (=> 9kft)

CLEC Physical Collo.

